Home Security System

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Abstract: *The Purpose of this study is to design a Home Security System which can be controlled wirelessly through smartphone. This Security System is a smart security solution designed using a Raspberry Pi Zero, a USB camera, and a SIM800L GSM module. The system enhances home security by capturing images of visitors, notifying the homeowner, and providing real time status updates.*

**Keywords:** Raspberry Pi Zero, GPS, Bluetooth, ThingSpeak

I. INTRODUCTION

In todays world home security is a major concern, and technology plays a crucial role in enhancing safety. The **Home Security System** using **Raspberry Pi Zero** is a smart and cost effective solution designed to improve doorstep by providing real-time visitor monitoring and alerts. This system captures an images of the visitor using a **USB camera** when they arrive at door. It then triggers a **buzzer** to alert the people inside the home and sends the captured images to the homeowner for verification. Additionally, the system integrates with **ThingSpeak,** a cloud-based IOT platform, to update visitor status (1 for arrival, 0 for no guest). To ensure notifications even in the absence of an internet connection, the project includes a **SIM800L GSM module**, which sends an **SMS notification** to the homeowner, providing real-time updates. The project combines **image processing**, **IOT, and GSM communication** to create a reliable home security system. It is an efficient alternative to traditional.

This System, adding **remote monitoring capabilities** and **automation** to enhance safety.

HARDWARE DESCRIPTION

Materials we used in design of hardware are:

Raspberry Pi Zero:
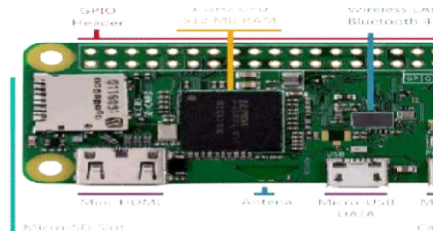
The Raspberry Pi Zero is a compact, budget-friendly, and energy-efficient single-board computer created by the Raspberry Pi Foundation. Launched in 2015, it is roughly the size of a gum stick and serves as a smaller, more affordable alternative to the Raspberry Pi Model A+. Designed for projects that prioritize a small footprint and low power usage, the Raspberry Pi Zero is ideal for space-constrained applications and cost- sensitive projects

P10 SIM800L GSM Module

The P10 SIM800L GSM Module is a wireless communication module that operates on the **GSM/GPRS** network to transmit and receive data. It is widely used in **IoT** projects, robotics, and other applications that need wireless connectivity. The **SIM800L** is a compact cellular module that supports **GPRS** data transmission, **SMS** sending and receiving, as well as voice calls. Its affordability, small size, and quad-band frequency compatibility make it an excellent choice for projects requiring long-range communication.

Lm2596 Dc – Dc Adjustable buck converter:

The **LM2596** is a **DC-DC** buck converter designed to efficiently reduce a higher input voltage to a lower output voltage. It is commonly used in power supply circuits for microcontrollers, battery-operated devices, and embedded system. This adjustable voltage regulator is known for its high efficiency and performance, making it a popular choice for applications such as power supplies, **DC-DC** conversion, and battery-powered systems.

SOFTWARE DESCRIPTION
The supporting software we used in our projects are:
a) Etcher:
Etcher is a free and open-source application developed by Balena, a company focused on IoT and edge computing. It simplifies the process of creating bootable USB drive and SD cards.
Etcher is commonly used to create bootable USB drives and SD cards for Linux, Raspberry Pi, and various other operating systems.

PROPOSED SYSTEM
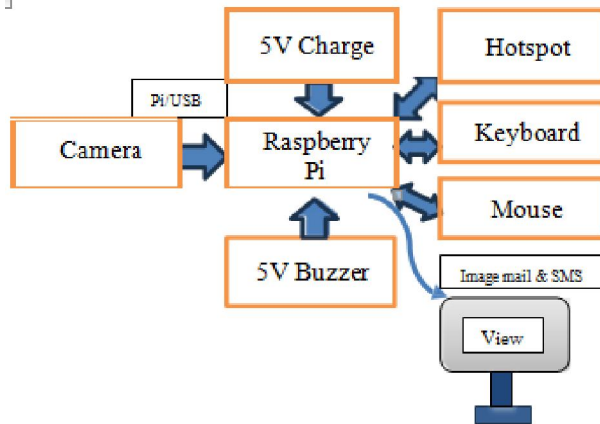
keyboard and mouse for controlling and a Computer for display image of visitors who arrives at door.
When a visitors comes at door then motion detects and The buzzer sounds. Then camera captures the image of visitors and send it to the Email via GSM. And also sends a msg on a particular number.

II. RESULT

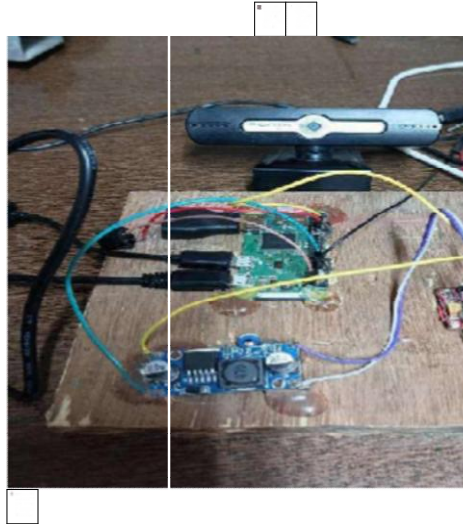1. The figure shows the actual setup of Home Security System.

Fig. Actual Home security System

a) Build a app which ThingSpeak for system. This app is used to collect, visualize and analyze data from sensors and connected devices, real- time monitoring also.

Fig. ThingSpeak App

ThingSpeak is an open-source IoT analytics platform designed for collecting, analyzing, and visualizing data form sensor and connected devices. It is commonly used for read-time monitoring, data logging, and automation. The ThingSpeak application offers an intuitive interface that allows users to interact with and visualize their data.

Data can be send to ThingSpeak using REST API or MQTT. Additionally, it supports integration with other services such as The Things Network, Senet, and Particele.io, enabling seamless connectivity and data management.

III. CONCLUSION

A properly installed home security system provides an essential layer of defense, discouraging intruders, notifying homeowners of possible threats, and ensuring peace of mind. In the end, it strengthens the overall safety and protection of the home and its residents

ACKNOWLEDGEMENT

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